Mixed Perturbative Expansion: the Validity of a Model for the Cascading

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Résumé en anglais	A new type of perturbative expansion is built in order to give a rigorous derivation and to clarify the range of validity of some commonly used model equations. This model describes the evolution of the modulation of two short and localized pulses, fundamental and second harmonic, propagating together in a bulk uniaxial crystal with non-vanishing second order susceptibility χ (2) , and interacting through the nonlinear effect known as “cascading” in nonlinear optics. The perturbative method mixes a multi-scale expansion with a power series expansion of the susceptibility, and must be carefully adapted to the physical situation. It allows the determination of the physical conditions under which the model is valid: the order of magnitude of the walk-off, phase-mismatch, and anisotropy must have determined values.
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[1] http://okina.univ-angers.fr/herve.leblond/publications
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